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Ascomycetous fungi of Siberia. 3. *Elytroderma baikalense* sp. nov.

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Abstract—*Elytroderma baikalense* is described herein as a species new to science, based on material collected from dying needles of *Pinus sylvestris* in the Lake Baikal region of Siberia. Images of ascomata, asci and ascospores are provided.

Key words—*Ascomycota*, pine disease, *Rhytismataceae*, taxonomy

Introduction

This paper is the third report on the ascomycetous fungi from the Lake Baikal region of Siberia (Morozova & Vasilyeva 2003; Vasilyeva & Morozova 2004). In 1995, a species of *Elytroderma* was found on second-year needles of *Pinus sylvestris* L. on Olkhon Island in Pribaikalsky National Park, Lake Baikal, and identified as *E. deformans* (Weir) Darker (Morozova 1996). However, additional study indicated that *Elytroderma deformans* occurs in North America, mostly on members of *Pinus* sect. *Trifoliae* (American hard pines, including *P. attenuata*, *P. banksiana*, *P. contorta*, *P. echinata*, *P. jeffreyi*, and *P. ponderosa*), but also on members of *Pinus* sect. *Parrya* (*P. cembroides* and *P. edulis*) (Hiratsuka 1987, Stone 1997). The range of *E. deformans* encompasses a major part of Canada

(British Columbia, the Northwest Territories, and Ontario) as well as the western United States (Arizona, California, Colorado, Idaho, Montana, Oregon, and Washington) (Minter 1980).

A second species, *Elytroderma torres-juanii* Diam. & Minter, was described on *Pinus brutia* Ten. from Greece; earlier names based on Spanish material—"*Hypoderma hispanicum*" J. Torres (Martínez & Torres 1965) and "*Elytroderma hispanicum*" (J. Torres) Darker (Darker 1967)—were invalid because no type specimen was indicated (Diamandis & Minter 1979). Later, *E. torres-juanii* was found on *Pinus stankewiczii* [= *P. brutia* var. *pityusa*] and *P. thunbergii* in the Crimea (Minter & Dudka 1996), and its overall distribution was characterized as "known on various species of pines from parts of Europe with a Mediterranean climate" (Minter: http://www.cybertruffle.org.uk/papers/rhytukra/elytrode.htm).

The European pines recorded as hosts of *Elytroderma torres-juanii* are in *Pinus* sect. *Pinus*, together with *P. sylvestris*, the host of the fungus from the Lake Baikal region. Thus, *E. torres-juanii* and the Siberian *Elytroderma* have hosts from the same section of *Pinus*. However, from a biogeographical standpoint, *E. deformans* would seem to be more likely to occur in eastern Siberia, with a distribution similar to that of *Delphinella balsameae* (Waterman) E. Müll., which has been reported from northeastern North America and also found in the Irkutsk region (Morozova & Vasilyeva 2003). This distribution does not apply to the Siberian *Elytroderma*, which differs from the two previously described species in ascospore characters.

Materials & methods

The specimens considered herein were collected by T.I. Morozova on Olkhon Island in Lake Baikal in 1995 and 1998. The specimens were studied microscopically using standard techniques. Images of the ascomata were obtained by T. I. Morozova using a Stereo Discovery V12 microscope equipped with an AxioCam ERc 5s camera, and images of asci and ascospores were obtained with an AxioLab A1 microscope and the same type of camera.

Taxonomy

Elytroderma baikalense T.I. Morozova, Lar.N. Vassilyeva & S.L. Stephenson, **sp. nov.** Figs. 1-3

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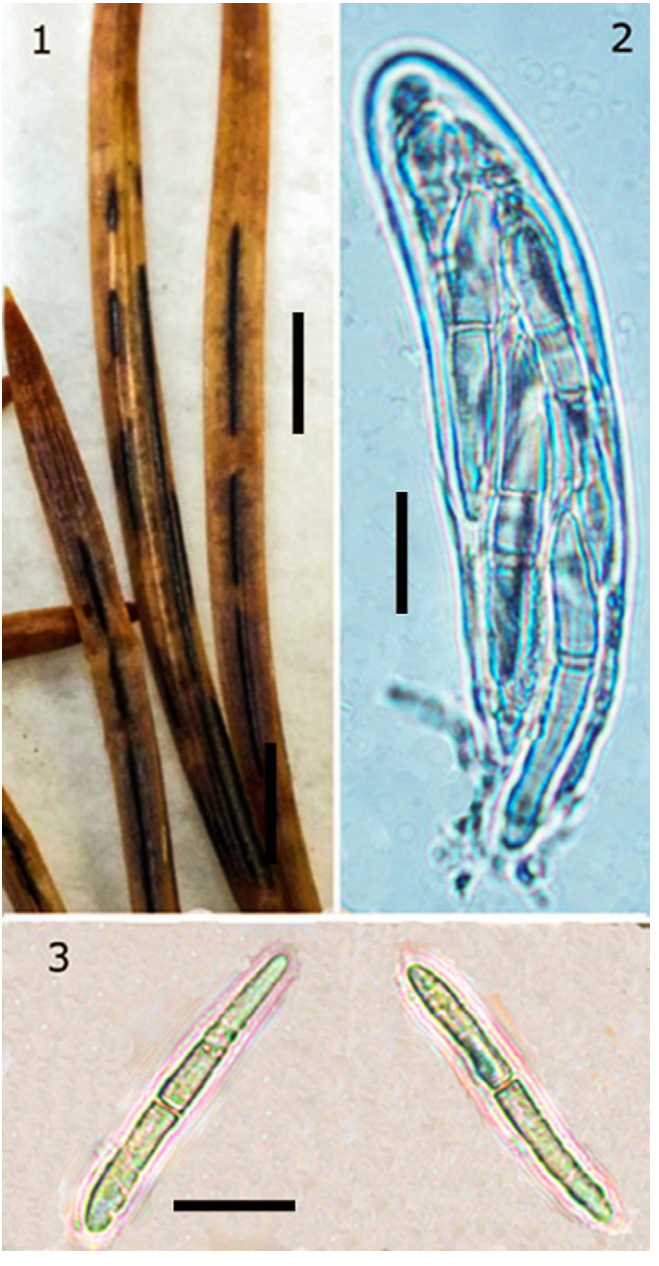
Differs from *Elytroderma deformans* by its smaller ascospores and the absence of witches' broom symptoms and from *E. torres-juanii* by its smaller hyaline ascospores.

Type: Russia, Irkutsk region, Lake Baikal, Pribaikalsky National Park, Olkhon Island, Olkhonsky District, 15 km east of the village of Khuzhir, on dying needles of *Pinus sylvestris*, 27 July 1998, T.I. Morozova (**Holotype,** VLA P-2934; **isotype,** IRK 45988).



Figs. 1–3. *Elytroderma baikalense* (holotype, VLA P-2934). 1. Ascomata. 2. Ascus with ascospores. 3. Ascospores. Scale bars: 1 = 3.0 mm; 2 = 20 μm; 3 = 25 μm.

Etymology: The specific epithet refers to Lake Baikal.

Ascomata embedded in brown needles or in brown portions of otherwise green needles, scattered or confluent when arranged in 2–3 rows along the needle, appearing as thin black lines, ranging from 2–3 to 15–20 mm long; forming diffuse brown zone lines across the needle; when viewed in a mid-point vertical section, the hymenium is covered by a clypeus comprising blackened fungal cells. Asci unitunicate, mostly saccate, 150–180 × 30–40 µm, with a J–negative apex, containing eight ascospores arranged in a fasciculate fashion. Ascospores clavate, hyaline, 1-septate, smooth, 60–80 × 6–8 µm, enveloped in a thin gelatinous sheath approximately 2 µm thick.

Additional specimens examined: **RUSSIA, Irkutsk region, Lake Baikal**, Pribaikalsky National Park, Olkhon Island, Tashkiney Valley, on dying needles of *Pinus sylvestris*, 19 July 1995, T.I. Morozova (IRK 45989); 15 km E of the village of Khuzhir, on dying needles of *Pinus sylvestris*, 27 August 1998, T.I. Morozova (IRK 46015); Sarayskaya Bay, on dying needles of *Pinus sylvestris*, 17 June 1997, T.I. Morozova (IRK 45990).

Notes: The two previously described *Elytroderma* species produce larger ascospores than *E. baikalense:* 90–130 × 8–10 µm for *E. deformans* and 130–165 × 9–12 µm for *E. torres-juanii. Elytroderma deformans* is known to cause a witches' broom of pine, but this has not been observed in either *E. baikalense* or *E. torres-juanii*. The ascospores of *E. torres-juanii* also differ from those of *E. baikalense* by their faintly yellowish brown coloration (Diamandis & Minter 1979).

Discussion

Needle viability in *Pinus sylvestris* is observed to be the longest on Olkhon Island for the entire region where *P. sylvestris* occurs. The island is the only place where needles remain viable on the trees for 10–12 years. Such extended viability is more characteristic of dark coniferous trees (e.g., *Abies sibirica* Ledeb. or *Picea abies* (L.) H. Karst.). The normal age of *Pinus sylvestris* needles is 4–5 years in ecologically pristine places around Lake Baikal, but this drops to only 2–3 years in the industrial centers and cities (Morozova 2004).

Three hotbeds of this newly described pine needle disease were found along the southeastern coast of Olkhon Island, with the distance between them being about 10–20 km. Over 20 years, these hotbeds did not spread but rather remained discrete. The affected trees lose as much as 75% of their foliage, and in the crown of the tree needles remain for only 1–2 years. However, the disease severity fluctuates from year to year. Sometimes, only individual needles are involved, but there are other years when all of the second-year needles become yellow and fall. The ascomata mature in August.

Although the trees in the hotbeds appear to be greatly weakened, we do not recommend cutting them. The older trees mostly have affected needles on the lower branches, which does not lead to a condition of complete blight. The young affected trees fall naturally and die out. Constant monitoring of the disease is recommended, and young plants should not be transported from Olkhon Island.

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